

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAMMY ZHENG

Appeal No. 2002-2223
Application No. 09/475,891

ON BRIEF

Before KIMLIN, JEFFREY T. SMITH and POTEATE, *Administrative Patent Judges*.

JEFFREY T. SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicant appeals the decision of the Primary Examiner finally rejecting claims 12 to 16, 18 and 20.¹ We have jurisdiction under 35 U.S.C. § 134.

¹ Claims 1 to 11, 17 and 19 have been indicated as containing allowable subject matter by the Examiner. (Final Rejection, paper no. 4).

BACKGROUND

Appellant's invention relates to the manufacture of a semiconductor device. Specifically the invention is directed to a process for etching unmasked areas of a gate stack having an anti-reflective coating layer formed on a doped silicon layer on a silicon oxide layer on a substrate. The anti-reflective coating is etched with a breakthrough etch until the silicon layer is exposed. The silicon layer is then etched with a bulk etch until about 40% of the silicon layer remains. The remaining silicon layer is etched with a high-selectivity etch until the silicon oxide is exposed. The remaining silicon layer is over etched with a very high-selectivity etch until silicon residues are cleared. (Brief, p. 2). Claim 12, which is representative of the claimed invention, appears below:

12. A method for etching unmasked areas of a gate stack having an anti reflective coating layer formed on a doped silicon layer on a silicon oxide on a substrate, comprising;

placing the substrate into an etch chamber;

etching the anti reflective coating layer with a breakthrough etch until the silicon layer is exposed;

etching the silicon layer with a bulk etch until about 40% of the silicon layer remains;

etching the remain silicon layer with a high-selectivity etch unit the silicon oxide is exposed; and

over-etching the remaining silicon layer with a very high-selectivity etch until silicon residues are cleared.

CITED PRIOR ART

As evidence of unpatentability, the Examiner relies on the following references:

Goda et al. (Goda)	5,336,365	Aug. 09, 1994
Maniar et al. (Maniar)	5,525,542	Jun. 11, 1996
Lee et al. (Lee)	5,665,203	Sep. 09, 1997
Grimbergen et al (Grimbergen)	6,081,334	Jun. 27, 2000 (filed April 17, 1998)

The Examiner rejected claims 12 to 14 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar; claims 15, 16 and 20 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12 to 14, further in view of Grimbergen; claim 18 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12, further in view of Goda. (Answer pp. 2-3).

Appellant has indicated (Brief, p. 3) that, for the purposes of this appeal, the claims do not stand or fall together. We will consider the claims separately only to the extent that separate arguments are of record in this appeal. Any claim not specifically argued will stand or fall with its base claim. Note *In re King*, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986); *In re Sernaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the Appellant concerning the above-noted rejection, we refer to the Answer and the Brief. For the reasons set forth below, we will sustain the Examiner's rejections.

In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention. *See, e.g., Heidelberg Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994) (When the patent invention is made by combining known components to achieve a new system, the prior art must provide a suggestion, or motivation to make such a combination.); *Northern Telecom v.*

Datapoint Corp., 908 F.2d 931, 934, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990) (It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor.); ***Uniroyal, Inc. v. Rudkin-Wiley Corp.***, 837 F.2d 1044, 1044, 1051, 5 USPQ 1434, 1438 (Fed. Cir. 1988).

The Examiner rejected claims 12 to 14 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar. The Examiner has found that Lee teaches a method for etching that differs from the claimed invention in the step of etching an anti-reflective layer. To remedy this deficiency the Examiner relied on Maniar. According to the Examiner, Maniar teaches that anti-reflective layers are used over a polysilicon layer and under a resist. (Answer, p. 2). Maniar discloses that the anti-reflective coating alleviates the problems associated with unwanted reflectance of radiation during lithography operations. (Col. 4). Maniar further discloses that the anti-reflective layer can be etched with a wet etch or gas mixture containing CF₄. Thus, a person of ordinary skill in the art would have been motivated to include an anti-reflective layer in the semiconductor device of Lee in order to alleviate the problems associated with unwanted reflectance. A person of

ordinary skill in the art would have recognized that the anti-reflective layer can be etched with a wet etch or gas mixture containing CF_4 .

Appellant argues the use of the teachings of Maniar would frustrate the purpose of Lee. (Brief, p. 4). We do not agree. As stated above, the use of an anti-reflective coating would alleviate problems associated with reflectance. A skilled artisan performing the invention of Lee would have recognized that the anti-reflective coating is suitable for etching processes.

Appellant argues that Lee is directed to a reactive ion etch in a CF_4 free environment and that one skilled in the art would not have been motivated to combine the teachings of Lee and Maniar because Lee teaches away from prior art which uses CF_4 . (Brief, pp. 4-5). We are not persuaded by Appellant's argument. Lee does not disclose that it is desirable to exclude CF_4 from the etching process. Simply because Lee describes an etching gas mixture that does not include CF_4 does not mean that using CF_4 would not have been obvious to a person skilled in the art. A prior art reference must be considered together with the knowledge of one of ordinary skill in the pertinent art. A reference need not explain every detail since it is speaking to those skilled in the art. *In re Paulsen*, 30 F.3d 1475, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994).

The Examiner also rejected claims 15, 16 and 20 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12 to 14, further in view of Grimbergen and claim 18 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12, further in view of Goda. The Examiner, in both the Answer and Final Rejection, provided explanations to support the rejection of these claims. The Appellant has failed to specifically traverse these remaining rejections. Consequently, we will uphold the rejection of the claims 15, 16, 18 and 20 for the reasons provided by the Examiner.

We note Appellant's issues 2-4, Brief pages 5-6, consider that the Examiner has improperly finally rejected the claimed subject matter. Questions regarding actions taken by the Examiner, such as requesting the withdrawal of a final rejection, are petitionable under 37 CFR § 1.181 to the Commissioner, and not subject to our review.

Based on our consideration of the totality of the record before us, having evaluated the *prima facie* case of obviousness in view of Appellant's arguments, we conclude that the subject matter of claims 12 to 16, 18 and 20 would have been

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obvious to a person of ordinary skill in the art from the combined teachings of the cited prior art. *See In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

CONCLUSION

The rejections of claims 12 to 14 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar; claims 15, 16 and 20 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12 to 14, further in view of Grimbergen; and claim 18 under 35 U.S.C. § 103(a) as unpatentable over the combination of Lee and Maniar, as applied to claims 12, further in view of Goda are affirmed.

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Time for taking action

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN
Administrative Patent Judge

JEFFREY T. SMITH
Administrative Patent Judge

LINDA R. POTEATE
Administrative Patent Judge

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